

WHAT IS CLAIMED IS:

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1. An image-processing device comprising:
an image-reading unit that reads image data
from a document optically;

an image-recording unit that records the image
10 data read onto recording paper;

a first-density-correction unit that corrects
first density characteristics that depend on said image-
reading unit;

a second-density-correction unit that corrects
15 second characteristics to reproduce density of the
document;

a third-density-correction unit that corrects
third density characteristics that depend on said image-
recording unit; and

20 a control unit that independently controls
each of said first, second and third density-correction
units to execute density correction.

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2. The image-processing device as claimed in claim 1, wherein said control unit includes a switch unit that switches a filter coefficient according to density of said image data, a data-correction unit that
5 executes data correction according to a density level, and a dot-correction unit that corrects formation of dots to be recorded.

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3. The image-processing device as claimed in claim 2, wherein said switch unit includes a selection
unit that sets a correction coefficient individually for
15 each of a low density area, a high density area, and an intermediate density area based on a fixed threshold, and selects a selection signal.

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4. The image-processing device as claimed in claim 2, wherein said data-correction unit sets a signal
different from said image data, and executes one of
25 addition of the signal to the said image data and

subtraction of the signal from said image data, followed by executing a gradation-reproduction process on said image data.

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5. The image-processing device as claimed in claim 2, wherein said dot-correction unit corrects data of adjacent pixels in two dimensions based on arrangement of pixels.

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6. The image-processing device as claimed in claim 1, further comprising an image-quality-selecting unit that selects an image-quality mode, wherein said control unit controls one or three of the first, second, and third density correction based on the image-quality mode selected by said image-quality-selecting unit.

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7. The image-processing device as claimed in claim 6, wherein said image-quality-selecting unit includes a parameter-grouping unit that collects parameters for density correction as a group, and an
5 image-quality-mode-assigning unit that assigns the group created by the parameter-grouping unit to an image-quality mode.

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8. The image-processing device as claimed in claim 7, wherein said image-quality-mode-assigning unit includes an image-quality-mode-selecting unit that
15 selects an image-quality mode for regular use among a plurality of predetermined image-quality modes, an image-quality-correction unit that corrects characteristics of the image-quality mode selected by the image-quality-mode-assigning unit, a parameter-
20 adjusting unit that adjusts parameters for the characteristics of the image-quality mode corrected by the image-quality-correction unit, and a parameter-storing unit that stores the parameters for the
25 characteristics of the image-quality mode adjusted by the parameter-adjusting unit.

9. The image-processing device as claimed in claim 7, wherein said image-quality-mode-assigning unit includes an image-quality-mode-selecting unit that selects an image-quality mode for regular use among a plurality of predetermined image-quality modes, an image-reading-correction unit that corrects image-reading characteristics of said image-processing device, an image-reading-parameter-adjusting unit that adjusts parameters for the image-reading characteristics of the image-processing device corrected by the image-reading-correction unit, and an image-reading-parameter-storing unit that stores the parameters for the image-reading characteristics of the image-processing device adjusted by the image-reading-parameter-adjusting unit.

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10. The image-processing device as claimed in claim 7, wherein said image-quality-mode-assigning unit includes an image-quality-mode-selecting unit that selects an image-quality mode for regular use among a plurality of predetermined image-quality modes, a pixel-generation-correction unit that corrects characteristics of pixel generation, a pixel-parameter-adjusting unit

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that adjusts parameters for the characteristics of the pixel generation corrected by the pixel-generation-correction unit, and a pixel-parameter-storing unit that stores the parameters for the characteristics of the pixel generation adjusted by the pixel-parameter-adjusting unit.

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11. The image-processing device as claimed in claim 7, wherein said image-quality-mode-assigning unit includes an image-quality-mode-selecting unit that selects an image-quality mode for regular use among a plurality of predetermined image-quality modes, an image-quality-correction unit that corrects characteristics of the image-quality mode selected by the image-quality-mode-assigning unit, a relative-parameter-adjusting unit that adjusts parameters for the characteristics of the image-quality mode corrected by the image-quality-correction unit relatively to the parameters set once by the image-quality-correction unit, and a parameter-storing unit that stores the parameters for the characteristics of the image-quality mode adjusted by the relative-parameter-adjusting unit.

12. The image-processing device as claimed in claim 7, wherein said image-quality-mode-assigning unit includes an image-quality-mode-selecting unit that selects an image-quality mode for regular use among a
5 plurality of predetermined image-quality modes, an image-reading-correction unit that corrects image-reading characteristics of said image-processing device, a relative-image-reading-parameter-adjusting unit that adjusts parameters for the image-reading characteristics
10 of the image-processing device corrected by the image-reading-correction unit relatively to the parameters once set by the image-reading-correction unit, and an image-reading-parameter-storing unit that stores the parameters for the image-reading characteristics of the
15 image-processing device adjusted by the relative-image-reading-parameter-adjusting unit.

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13. The image-processing device as claimed in claim 7, wherein said image-quality-mode-assigning unit includes an image-quality-mode-selecting unit that
selects an image-quality mode for regular use among a
25 plurality of predetermined image-quality modes, a pixel-

generation-correction unit that corrects characteristics
of pixel generation, a relative-pixel-parameter-
adjusting unit that adjusts parameters for the
characteristics of the pixel generation corrected by the
5 pixel-generation-correction unit relatively to the
parameters once set by the pixel-generation-correction
unit, and a pixel-parameter-storing unit that stores the
parameters for the characteristics of the pixel
generation adjusted by the relative-pixel-parameter-
10 adjusting unit.

15 14. A method of processing an image by use of
an image-processing device that includes an image-
reading unit, an image-recording unit, a first-density-
correction unit, a second-density-correction unit and a
third-density-correction unit, said method comprising
20 the steps of:

reading image data from a document optically
by use of the image-reading unit;

recording the image data on recording paper by
use of the image-recording unit;

25 correcting first density characteristics that

depend on said image-reading unit by use of the first-density-correction unit;

correcting second characteristics to reproduce density of the document by use of the second-density-correction unit;

correcting third density characteristics that depend on said image-recording unit by use of the third-density correction unit; and

controlling said first-density-correction unit, said second-density-correction unit, and said third-density-correction unit independently.

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15. The method as claimed in claim 14, further comprising the steps of:

switching a filter coefficient according to density of said image data;

correcting data according to a density level;

and

correcting formation of dots to be recorded.

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16. The method as claimed in claim 15,
further comprising the steps of:

setting a correction coefficient individually
for each of a low density area, a high density area, and
5 an intermediate density area based on a fixed threshold;
and

selecting a selection signal among said low,
high, and intermediate density areas.

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17. The method as claimed in claim 15,
further comprising the steps of:

15 setting a signal different from said image
data;

executing one of addition of the signal to the
said image data and subtraction of the signal from said
image data; and

20 executing a gradation-reproduction process on
said image data.

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18. The method as claimed in claim 15,
further comprising the step of correcting data of
adjacent pixels in two dimensions based on arrangement
of pixels.

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19. The method as claimed in claim 14,
10 further comprising the steps of:
selecting an image-quality mode that
determines a type of image processing; and
controlling density correction executed by one
or all of the first, second, and third density
15 correction units based on the image-quality mode
selected.

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20. The method as claimed in claim 19,
further comprising the steps of:

collecting parameters for the density
correction as a group; and

25 assigning the created group to an image-

quality mode.

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21. An image-processing device comprising:
an image-reading unit that reads image data
from a document optically;

an image-recording unit that records the image
10 data read by said image-reading unit onto recording
paper;

a first-density-correction unit that corrects
first density characteristics that depend on said image-
reading unit;

15 a second-density-correction unit that corrects
second characteristics to reproduce density of the
document; and

a control unit that independently controls
each of said first and second density-correction units
20 to execute density correction based on an image-quality
mode applied by an operation unit.

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22. The image-processing device as claimed in claim 21, wherein said operation unit includes an operation screen where image-quality modes are displayed, one of said image-quality modes being selected so that
5 each of said first and second density-correction units is adjusted individually by the control unit.

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23. An image-processing device comprising:
an image-reading unit that reads image data from a document optically;

an image-recording unit that records the image
15 data read by said image-reading unit onto recording paper;

a density-correction unit that corrects density characteristics that depend on said image-recording unit; and

20 a control unit that independently controls said density-correction unit to execute density correction based on an image-quality mode applied by an operation unit.

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24. The image-processing device as claimed in claim 23, wherein said operation unit includes an operation screen where image-quality modes are displayed, one of said image-quality modes being selected so that
5 said density-correction unit is adjusted individually by the control unit.

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25. A method of processing an image by use of an image-processing device that includes an image-reading unit, an image-recording unit, a first-density-correction unit and a second-density-correction unit,
15 said method comprising the steps of:

reading image data from a document optically by use of the image-reading unit;

recording the image data on recording paper by use of the image-recording unit;

20 correcting first density characteristics that depend on said image-reading unit by use of the first-density-correction unit;

correcting second characteristics to reproduce density of the document by use of the second-density-
25 correction unit; and

controlling said first-density-correction unit
and said second-density-correction unit independently.

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26. The method as claimed in claim 25,
further comprising the steps of:

selecting an image-quality mode that
10 determines a type of image processing; and
controlling density correction executed by one
or both of said first and second density-correction
units independently based on the image-quality mode
selected.

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27. A method of processing an image by use of
20 an image-processing device that includes an image-
reading unit, an image-recording unit and a density-
correction unit, said method comprising the steps of:

reading image data from a document optically
by use of the image-reading unit;
25 recording the image data on recording paper by

use of the image-recording unit;

correcting density characteristics that depend
on said image-recording unit by use of the density
correction unit; and

5 controlling said density-correction unit
independently.

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28. The method as claimed in claim 27,
further comprising the steps of:

selecting an image-quality mode that
determines a type of image processing; and

15 controlling density correction executed by
said density-correction unit independently based on the
image-quality mode selected.

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29. A record medium readable by a machine,
tangibly embodying a program of instructions executable
by the machine to perform method steps for processing an

25 image by use of an image-processing device that includes

an image-reading unit, an image-recording unit, a first-density-correction unit, a second-density-correction unit and a third-density-correction unit, said method steps comprising:

- 5 reading image data from a document optically
by use of the image-reading unit;
 recording the image data on recording paper by
use of the image-recording unit;
 correcting first density characteristics that
10 depend on said image-reading unit by use of the first-
density-correction unit;
 correcting second characteristics to reproduce
density of the document by use of the second-density-
correction unit;
15 correcting third density characteristics that
depend on said image-recording unit by use of the third-
density correction unit; and
 controlling said first-density-correction unit,
said second-density-correction unit, and said third-
20 density-correction unit independently.

- 25 30. The record medium as claimed in claim 29,

wherein said method steps comprising:

selecting an image-quality mode that

determines a type of image processing; and

controlling density correction executed by

5 said density-correction unit independently based on the
image-quality mode selected.

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31. An image-processing system comprising:

an image-reading unit that reads image data
from a document optically;

15 an image-recording unit that records the image
data read onto recording paper;

a first-density-correction unit that corrects
first density characteristics that depend on said image-
reading unit;

20 a second-density-correction unit that corrects
second characteristics to reproduce density of the
document;

a third-density-correction unit that corrects
third density characteristics that depend on said image-
recording unit;

25 a control unit that independently controls

each of said first, second and third density-correction units to execute density correction; and

an external-application interface that exchanges the image data with an external application.

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32. The image-processing system as claimed in claim 31, wherein the image data is transmitted through said external-application interface to the external application after being processed through said first and second density-correction unit.

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33. The image-processing system as claimed in claim 31, wherein the image data is processed through said third-density-correction unit after being received from the external application through said external-application interface.

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